

**About this document:** This is an installment of the Massachusetts State Oral Health Series (MOHS), developed by the Massachusetts Department of Public Health (MDPH). The series focuses on important issues in oral health in the state through topic-specific installments to be released over time. This issue outlines the programs and statistics in Massachusetts. Please visit [www.mass.gov/orgs/office-of-oral-health](http://www.mass.gov/orgs/office-of-oral-health) for more information.

## FOCUS ON ORAL HEALTH

In recent years, oral health has become a national priority due to the evidence of growing inequities in oral health-related outcomes and access to care in communities. This document outlines the emerging connections between chronic disease and oral health, including data trends and next steps for Massachusetts. Below is the program that have made oral health a priority:



### United States

Oral Health is a **Healthy People 2030** leading health indicator topic<sup>1</sup>

## THE FACTS

### Oral Health and Chronic Disease<sup>2</sup>

**Chronic diseases make up the top causes of death and disability in the world.** These are conditions that persist longer than a few months. Poor oral health can both contribute to and be associated with certain chronic conditions including:

- **Diabetes**
- **Heart disease**
- **Respiratory disease**
- **Cancers**
- **Obesity**

Many oral health conditions and chronic diseases are preventable with education and early action. **Prevention is crucial to reducing disease burden.** Research has shown that incorporating oral health messaging into chronic disease prevention and management programs is successful in improving both chronic disease and oral health outcomes.

### The Connection

There are several ways to think about the bi-directional relationship between oral health and chronic disease:

- **Direct relationship:** Chronic diseases and their side effects directly associated with oral health issues and vice versa.
- **Indirect relationship:** Treatments for chronic diseases and their side effects indirectly associated with oral health issues and vice versa.
- **Shared risk factors:** Chronic diseases and oral health issues share common risk factors.

### Multiple Chronic Conditions<sup>3</sup>

Since oral health conditions can be chronic in nature, they can occur concurrently with other chronic conditions. **Those with multiple chronic conditions often have worse long-term health outcomes compared to those with just one chronic condition.** By promoting oral health prevention and early treatment, it is possible to improve long-term outcomes for those with chronic disease.

# THE LITERATURE

## Diabetes

### **Periodontal disease and tooth decay may be associated with diabetes:**

Research suggests that periodontal disease and tooth decay can exacerbate diabetes and may be linked with type 2 and gestational diabetes.<sup>6,7</sup> In particular, these conditions affect inflammation and can increase blood sugar, which have both been shown to be linked to insulin resistance.<sup>6-8</sup> However, there is still a need for longitudinal studies to better assess causal relationships.

### **Diabetes may be associated with periodontal disease and tooth decay:**

Research also suggests that those who have diabetes are generally more likely to contract infections related to periodontal disease or tooth decay due to poor healing of oral tissues.<sup>7,8</sup> Those who have diabetes that is not under control are more likely to have high glucose levels in the saliva which can cause tooth decay. Periodontal disease and tooth decay are commonly referred to as a side effect of diabetes.<sup>8</sup>

## Heart Disease

### **Periodontal disease and tooth decay may be associated with heart disease:**

Though the relationship is still in the preliminary stages of investigation in the literature, studies show that some oral health conditions may increase the risk of heart disease in some individuals. In particular, oral health conditions that cause inflammation and damage blood vessels, like periodontal disease and tooth decay, may put individuals at a higher risk for developing heart conditions or exacerbating existing conditions.<sup>8-10</sup>

## Respiratory Disease

### **Periodontal disease and tooth decay may be associated with respiratory disease:**

Some research suggests that increased bacteria related to periodontal disease and tooth decay can be linked to certain respiratory conditions including pneumonia, bronchitis, emphysema, and COPD.<sup>11-13</sup> Bacteria from the mouth can colonize in the respiratory tract. Respiratory diseases related to oral conditions more commonly occur in the elderly, those who wear dentures, and those who have decreased immune system functioning.<sup>13</sup>

## Cancer

### **Periodontal disease and tooth decay may be associated with some cancers:**

Preliminary research suggests that periodontal disease and tooth decay may be linked to some cancers such as lung, pancreatic, and head/neck, even after controlling for other risk factors such as smoking and diet.<sup>14-17</sup> One study suggests that men with periodontal disease had a 35% increased risk for blood cancer and a 21% increased risk for any cancer.<sup>15</sup> In addition, the study suggests that men with a history of periodontal disease were at a 63% increased risk of developing pancreatic cancer after controlling for a variety of confounding factors.<sup>15</sup> Another study found that those with gum disease had a 43% higher risk of developing esophageal cancer and a 52% higher risk of developing stomach cancer compared to those with healthy gums<sup>18</sup>.

## Obesity

### **Obesity may be associated with periodontal disease and tooth decay:**

Recent literature has begun to investigate the effects of obesity on periodontal disease. Preliminary research speculates that since secretions of adipose tissue put individuals at a great risk for inflammation, there may be decreased immune status and decreased blood flow to the gums.<sup>19,20</sup>

# THE DATA Trends in Massachusetts

The primary source of data available to assess the relationship between chronic diseases and oral health in Massachusetts adults is the Behavioral Risk Factor Surveillance Survey (BRFSS).<sup>4</sup> The survey is conducted annually and oral health is assessed every other year. All percentages in this report are weighted to represent the total Massachusetts population in 2018, the most recent year available for oral health data

## Shared risk factors in Massachusetts

As previously outlined, there are a number of shared risk factors affecting both oral health and chronic diseases. The weighted estimates of the Massachusetts population in 2018 based on the BRFSS survey are presented below:

### Tobacco Use

13% reported being current smokers

25% reported being former smokers

### Alcohol Use

20% had an episode of binge drinking in the past month

8% had an episode of heavy drinking in the past month

Binge drinking is drinking 5 or more drinks per occasion for men and 4 or more drinks per occasion for women.

Heavy drinking is drinking 15 or more drinks per week for men or 8 or more drinks per week for women.

### Obesity

62% were categorized as overweight

26% were categorized as obese

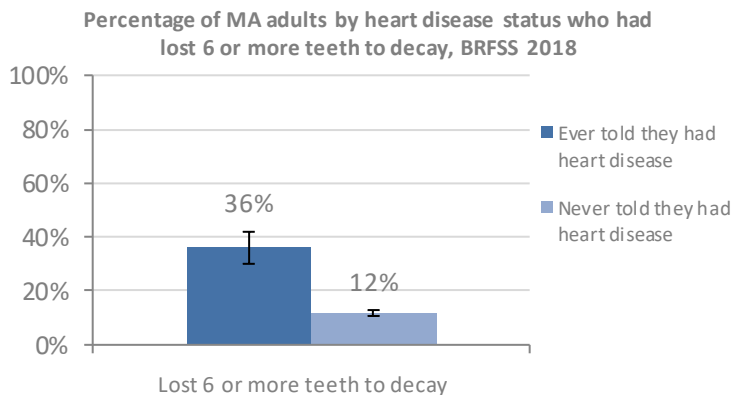
### Oral Hygiene

26% had not had a dental visit within a year

13% had 6+ teeth missing

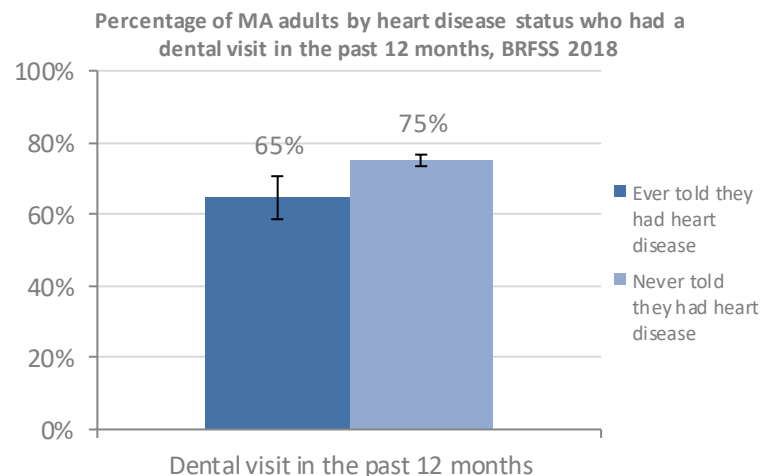
## Oral health and chronic disease in Massachusetts

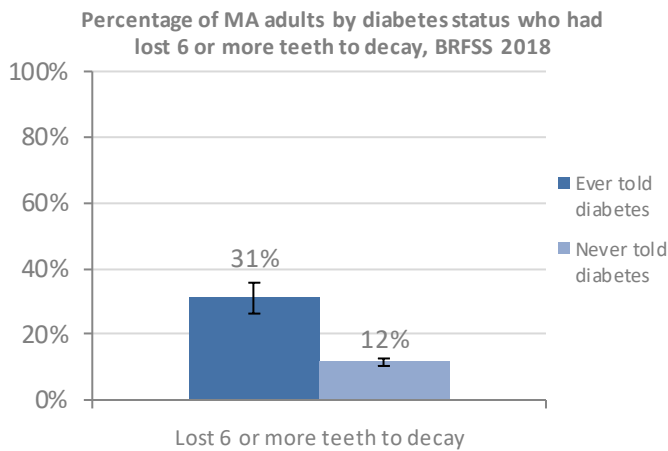
Though research is still needed, BRFSS provides a look into some of the relationships that might exist between oral health and chronic diseases in Massachusetts, which are outlined below. All results have been adjusted for age.



Of Massachusetts residents in 2018 who reported ever being told that they had heart disease, 36% had lost 6 or more teeth to decay. This percentage is 3 times higher than for those who had never been told they had heart disease. These results suggest that patients with heart disease or risk factors for heart disease may benefit from earlier dental care to prevent tooth loss.

Despite having a higher risk for tooth loss, 35% of Massachusetts residents who were ever told that they had heart disease had not been seen by a dental provider in the past year. This is a significantly higher percentage than those who had never been told that they had heart disease. Though more research is needed to determine the barriers to dental care and risk factors for oral disease for individuals with heart disease, medical and dental providers could play a role in ensuring these patients receive care.



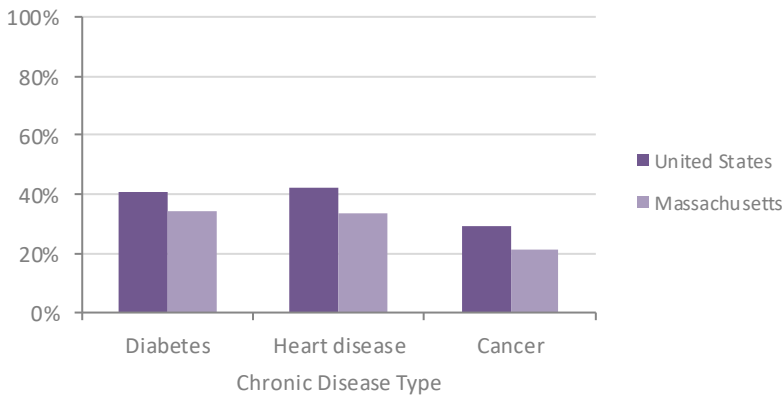


Of Massachusetts residents in 2018 who were ever told that they had diabetes (excluding those who were told during pregnancy), 31% had lost 6 or more teeth to decay. The percentage is almost 3 times higher than those who were never told that they had diabetes. National studies have shown a relationship between diabetes and tooth decay/loss (see pg. 2). However, more research is needed on the effective strategies to address the unique oral health needs of those with diabetes.

## National Data<sup>5</sup>

*Though research is still needed, National BRFSS data provides a look into some of the relationships that might exist between oral health and chronic diseases in the U.S. Results outlined below have not been adjusted for age.*

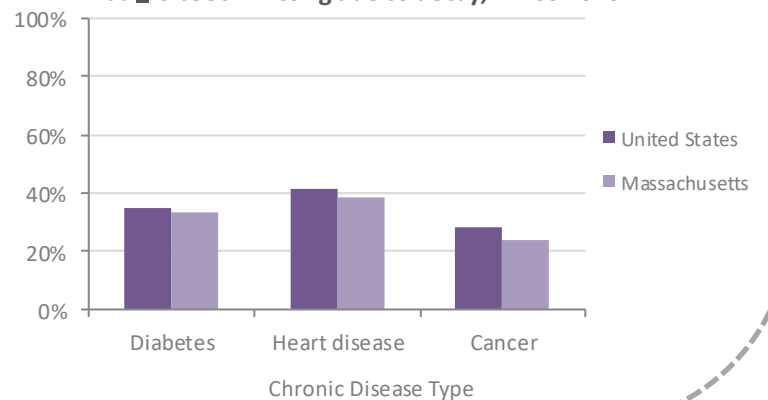
**Percentage of U.S. adults by chronic disease type who had not visited the dentist in the past year, BRFSS 2016**



The percentage of those who did not have a dental visit in the past year is lower in Massachusetts than in the United States across all chronic disease types. The percentage of those without dental visits for those with cancer was the lowest among all chronic diseases. The percentage of those without dental visits for those with diabetes and heart disease were the highest among all chronic diseases.

Nationally, the percentage of those who had 6 or more teeth missing is similar across chronic disease types to that of Massachusetts. Those who were ever told that they had coronary heart disease had a higher percentage of 6 or more teeth missing compared to other chronic diseases both in Massachusetts and nationally.

**Percentage of U.S. adults by chronic disease type who had ≥ 6 teeth missing due to decay, BRFSS 2016**



# THE PROGRAMS

## A focus on education

Massachusetts leverages federal funding for diabetes and cardiovascular disease to incorporate oral health into its educational campaigns. In particular, promoting healthy eating as a way of managing diabetes and hypertension and preventing oral health issues is a key activity.

The DPH **Office of Oral Health** addresses chronic disease concerns within all of its programs, directly and indirectly.<sup>22</sup> Notably, the office focuses on **training providers and improving processes** between medical and dental disciplines to be aware of the connections between oral health and other chronic diseases, this work was initiated through a federally funded project called **Linkages** which wrapped up in 2016. This continued work involves initiating quality improvement projects at community health centers across the state to increase the number of medical patients with a dental home. Many of the quality improvement projects directly address chronic disease management clinics such as diabetes.

## Addressing Shared Risk Factors

**What are shared risk factors?** A shared risk factor is when more than one disease or conditions share underlying risks. Certain risk factors can contribute to the development of more than one disease or condition. Addressing shared risk factors for certain conditions has been shown to improve multiple health outcomes.<sup>23</sup>

Much of the DPH chronic disease programming focuses both directly and indirectly on addressing the shared risk factors between chronic diseases and oral health to prevent and reduce the impact of both. Below are risk factors that contribute to both oral health issues and a variety of chronic diseases :

- **Tobacco**

The DPH **Massachusetts Tobacco Cessation and Prevention Program** (MTCP) is a program that provides resources to providers and patients who are seeking guidance with smoking cessation.<sup>24</sup> Tobacco use is a risk factor for chronic diseases related to oral health such as cancer, heart disease, respiratory diseases and cancer.

- **Nutrition and obesity**

- The **Healthy Schools Program** is a partnership between DPH and the Department of Elementary and Secondary Education to support school districts in implementation of health promoting policies and practices for nutrition and physical activity.
- **Working on Wellness** is a statewide training and capacity building program that engages businesses to develop and implement comprehensive worksite wellness initiatives.

- **Alcohol Use**

The DPH **Bureau of Substance Addiction Services** provides educational resources and support to community programs across the state. Alcohol use is a predictor of many chronic diseases and oral health concerns.<sup>25</sup>

# NEXT STEPS

The **goal of the MDPH Office of Oral Health** is to improve, promote and protect the oral health of all Massachusetts residents throughout their lifespan by focusing on prevention, education, and linkage of dental and medical care. The next steps include:

**Continuing to address shared risk factors:** DPH will continue to address the shared risk factors for oral health and chronic disease by implementing programs in oral health, tobacco cessation, nutrition, obesity, and substance use. Collaboration between program areas will help to ensure that shared risk factors are addressed in every topic area.

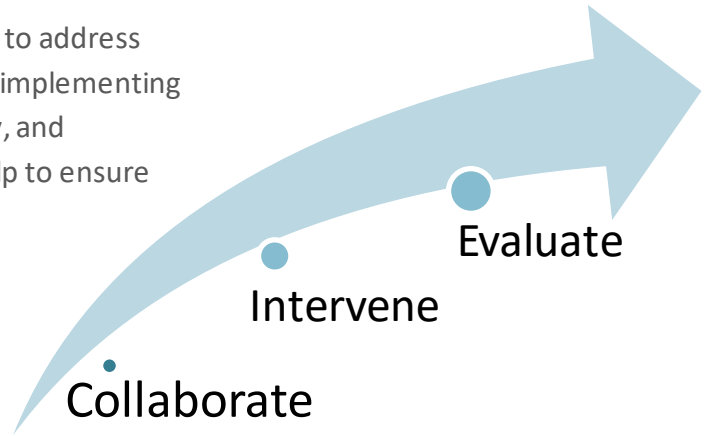
**Incorporating more oral health messages into chronic disease management programs:** DPH will also collaborate with chronic disease prevention and control programs across the state to incorporate messages that promote the importance of maintaining good oral health.

**Training and educating providers on oral health:** The DPH Office of Oral Health will continue to train medical and dental providers across disciplines on prevention and early treatment of oral health concerns for those with chronic diseases. These trainings will work to incorporate messages about the connections between oral health and chronic diseases.

**Evaluation and statewide surveillance:** Data on the connection between oral health and chronic disease in the state is somewhat limited due to the data that is currently collected for statewide surveillance. The DPH Office of Oral Health is currently working to improve the statewide surveillance system to elaborate on the relationship between oral health and chronic disease.

**Dental/medical providers can aid in this effort by:** ensuring that all provider staff receive **training and education** focused on the importance of incorporating oral health messaging into chronic disease programs, providing **screening / referrals** for oral health treatment as needed, and **communicating** between medical and dental practices.

**Community stakeholders can aid in this effort by:** **developing** programs and materials that emphasize the importance of good oral health for those with chronic diseases, **engaging** with community members and other stakeholders to identify the barriers to accessing oral health care in the community, and **connecting** individuals with community resources.



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